NOTE ON THE SEX OF MOSQUITO LARVAE

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PLATE XXVI

In the *Lancet* of March 30, 1912, I described very shortly how it was possible to distinguish sex in anopheline larvae. The following contribution, the result of subsequent dissections, goes a little further into the matter.

With regard to anophelines, generally speaking the dark or brown testis can be distinguished in living larvae by a lens; or, if the larva is very young, say about three days, by a two-thirds lens. Often the testes are more easily seen from the ventral surface. If the larva is lying dorsal surface up, the simplest way to obtain a ventral view is to invert the slide. Fig. 1 (Pl. XXVI) shows the testes in the sixth abdominal segment, and the vasa deferentia extending downwards. The testis is enclosed in a hard brown sac (fig. 2*b*). On pressure it is seen to contain both immature and fully developed spermatozoa. The latter are found in various interesting stages of development. The testis is frequently marked out into areas, the posterior of which is seen to enclose coils of spermatozoa. Fig. 11 shows the areolation. In films stained with Romanowsky, the younger tailed spermatozoa resemble adult ones.

A simple way to dissect out the testis is to drag out the stomach by the ordinary method, and then to stroke gently the abdominal segments downwards with the needle held flat. In the pupa the dissection is of course easier, and the entire male apparatus can be got out, as shown in fig. 3. The spermatheca and ovaries are also well formed in the pupa.

Fig. 4 represents the adult male organs, and is introduced for the sake of comparison with the culicine arrangement.

In the female larva the ovary lies in about the same situation as the testis in the male, but stretches through perhaps two or three segments owing to its length.

With regard to culicines, in the larva the testis is not always visible. Working in Kashmir lately, I have, however, noticed a species (probably *C. fatigans*) in which the testis, often of a greenish tint, is easily recognised by the naked eye.

There is no brown enclosing sac, and the shape is more like a spindle. It contains spermatozoa. Many dissections were made to see when the earliest appearance of testes occurred. Fig 7a is from a specimen twenty-four hours old. Fig. 7b from another fourteen hours old.

Fig. 8 represents the male organs of a culicine pupa; the arrangement, it will be seen, is as in the adult.

The ovaries are recognisable in early larval life, and can occasionally be seen with the microscope in the living specimen.

The commonest anophelines examined were *Myzomyia culicifacies* and *M. listoni*, *Nyssorhynchus fuliginosus* and *Neocellia stephensi*.

In this connection it might be mentioned that, in the case of *Diva* larvae taken in Lahore, and in another species found in Kashmir, and described by Miall in 'Aquatic Insects,' the testes were even more conspicuous than those of anophelines.

EXPLANATION OF PLATE XXVI

All these figures, except No. 11, have been drawn with a Leitz Zeichenokular.

Fig. 1. Hinder portion of advanced stage of last instar of the larva of an anopheline (*Neocellia willmori*) mounted in canada balsam. The two pear-shaped testes visible in sixth segment. The three dark masses in the middle line are the contents of the intestinal tube.

Fig. 2. Testis and vas of anopheline larva dissected out.
(*a*) Body of testis. (*b*) Brown sheath. (*c*) Vas deferens. (*d*) Spermatozoa pressed out.
Specimen dried and stained.

Fig. 3. Male organs of anopheline pupa.
(*a*) Testes. (*b*) Vas deferens. (*c*) Gland. (*d*) Vesicula passing into ductus.
Specimen dried and stained.

Fig. 4. Male organs of adult anopheline.
(*a*) Testes. (*b*) Glands. (*c*) Vesicula passing into ductus.
Specimen mounted in formalin.

Fig. 5. Ovary of fairly young anopheline larva.

Fig. 6. Testis and vas deferens of culicine larva dissected out. Fresh.

Fig. 7a. Dissection of culicine larva twenty-four hours old, showing last segment and part of syphon.
(*a*) The two testes. (*b*) Débris, the result of dissection. (*c*) Syphon.
Specimen mounted in formalin.

Fig. 7b. Dissection of culicine larva fourteen hours old, showing the two testes.

Fig. 8. Culicine pupa, male organs.
(*a*) Testis with vas deferens (broken off). (*b*) Vas deferens. (*c*) Vesicula. (*d*) Gland.
Note different arrangement from anopheline.
Specimen mounted in formalin.

Fig. 9. Male organs of adult culicine.
(*a*) Spermatozoa pressed out. (*b*) Testes. (*c*) Vas deferens. (*d*) Vesicula. (*e*) Gland.
Note attachment of upper ligament of gland to vas deferens.
Specimen stained and mounted in canada balsam.

Fig. 10. Ovaries of culicine larva seen attached to a fragment of an abdominal segment.

Fig. 11. Figure of larva testis showing areolation and spermatozoa in different stages of development, as seen in a fresh specimen. Area (*a*) contains ripe spermatozoa greatly magnified. Areas (*b*), (*c*), (*d*), spermatozoa in various stages of development.

Fig. 12. Hind portion of abdomen of a culicine larva, showing testes.